



National Aeronautics and Space Administration

January 30, 2003

NRA-03-OES-02

RESEARCH ANNOUNCEMENT

**EARTH SYSTEM SCIENCE RESEARCH
USING DATA AND PRODUCTS
FROM TERRA, AQUA, AND ACRIM SATELLITES**

**Notice of Intent Due February 28, 2003
Proposals Due April 15, 2003**

OMB Approval No. 2700-0087

**EARTH SYSTEM SCIENCE RESEARCH
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**NASA Research Announcement
Soliciting Research Proposals
For the
Period Ending
April 15, 2003**

**NRA 03-OES-02
Issued January 30, 2003**

**Office of Earth Science
National Aeronautics and Space Administration
Washington, DC 20546**

EARTH SYSTEM SCIENCE RESEARCH USING DATA AND PRODUCTS FROM TERRA, AQUA, AND ACRIM SATELLITES

I. INTRODUCTION:

The NASA vision is: *To improve life here
To extend life to there
To find life beyond*

The NASA mission is: *To understand and protect our home planet
To explore the universe and search for life
To inspire the next generation of explorers

...as only NASA can.*

The mission of NASA's Earth Science Enterprise (ESE) is to develop a scientific understanding of the Earth system and its responses to changes, as well as to improve prediction capabilities for climate, weather, and natural hazards. Thus, the Earth science research program aims to gain deeper insight by describing how the components of the Earth system function, how they interact, and how they may evolve in the future. These interactions occur on a continuum of spatial and temporal scales ranging from short-term weather to long-term climate variations, and from local and regional to global scales. The challenge is to develop the ability to predict changes that will occur in the next decade to century, both naturally and in response to human activities.

In general, the Enterprise aims to provide scientific answers to five challenging scientific and societally-relevant Earth system science questions:

- **Earth's natural variability:** How is the global Earth System changing?
- **Forcing factors:** What are the primary forcings of the Earth System?
- **Response to disturbances:** How does the Earth System respond to natural and human-induced changes?
- **Consequences:** What are the consequences of change in the Earth System for human civilization?
- **Prediction:** How well can we predict changes in the Earth System that will take place in the future?

In the ESE Research Strategy, there is a set of twenty-three subsidiary questions (See Table 1) associated with these five main categories of questions. The complete text of the current ESE Research Strategy may be found at:

http://www.earth.nasa.gov/visions/researchstrat/Chap1_Research_Strategy.doc

II. Purpose of this NASA Research Announcement:

NASA made a commitment to the Earth Science community to provide a long-term series of critical global measurements to understand the Earth system and its interactions towards ultimate prediction of the Earth System behavior. One of the key requirements is to provide well-calibrated, multi-year and multi-satellite data and product series of key observations that can only be provided from space. The Earth Observing System (EOS) was intended to provide these observations. NASA is now fulfilling its commitment through the development and implementation of the first series of these satellites and the comprehensive EOS Data and Information System (EOSDIS) to acquire, process, archive, and distribute these observations.

This NASA Research Announcement (NRA) provides an opportunity for scientists to undertake significant studies concerning some of the Earth Science Enterprise's key research questions through the use of data and derived products from three of the Earth Observing System (EOS) series of satellites, namely Terra, ACRIMSAT, and Aqua, and their measurement sensors. It represents both a continuation of the research aspects of the EOS Instrument Teams from these satellites and new opportunities for scientists to conduct research projects using the new data and products resulting from these satellites.

This NRA represents an opportunity for investigators to become involved in the utilization of EOS data to provide answers to the science questions identified by NASA's Earth Science Enterprise. It recognizes the transition from a pre-launch to a post-launch environment. Thus, while in the past, the focus of NASA-sponsored research activity has been in the areas of sensor calibration, algorithm development and modification, and product validation, now less emphasis will need to be placed upon algorithm development and more emphasis will be directed to algorithm refinement, accompanied by active utilization of these data in scientific research, modeling, synthesis, and diagnostic analysis.

The approach being used for the process of EOS recompetition is as follows:

- 1.) In order to maintain the corporate knowledge and progress made by the existing science teams, NASA plans to retain the original peer-reviewed instrument principal investigators and team leaders. In addition, the original peer-reviewed algorithms for product generation will be used to sustain data continuity. Current team leaders and principle investigators are being requested to submit continuation proposals for the Facility Instruments: MODIS, AIRS, AMSR-E, MOPITT and ASTER, and for the

Principal Investigator (P.I.) Instruments: CERES, MISR, and ACRIM-III. In addition, instrument team principal investigators (i.e. CERES, MISR, and ACRIM-III) are also responsible for proposing the participation and support of absolutely essential co-investigators and team members for their proposed investigations. No new team leader or principle investigator proposals are being requested through this NRA.

2.) Team members for the facility instruments will be selected based on new proposals submitted to this NRA. The proposals will be peer reviewed and competitively selected. This allows for the renewal and replacement of some existing investigators, as well as the addition of new team members.

3.) An opportunity for conducting data analysis and modeling based upon data from the Terra, Aqua, and ACRIM satellites is being provided.

4.) A single peer-reviewed process will be used to evaluate all proposals in response to this NRA, as well as the team leader and principle investigator continuation proposals in response to letter requests.

III. Components of this NRA:

This NRA solicits two types of proposals:

- 1.) **"EOS Algorithm Refinement Proposals"** will be accepted from prospective new or continuing science team members who wish to refine and maintain the derived product quality for any of the currently-approved Algorithm Theoretical Basis Document (ATBD) algorithms. The scientific justification for such improvements must be compelling and should be the focus of the proposed investigations. Current team members from foreign countries need not reapply and do not need to submit proposals to this NRA.
- 2.) **"Science Data Analysis and Modeling Research Proposals"** will be accepted from any proposer with innovative approaches to making scientific use of the data or products from those NASA research sensors listed in Appendix A: Scientific Guidelines for this NRA. These data and/or products can be used individually, in combination with that from other sensors, or in conjunction the appropriate data from other sources and satellites. Proposers selected under this category may also request to become members of one or more instrument science teams.

Respondents to this NRA may propose to either or both types of proposals described above; however, a single proposal should be for either Algorithm Refinement or Science Data Analysis and Modeling, but not both.

EOS Algorithm Refinement Proposals

The main objective of the EOS science missions is to develop a comprehensive set of

long-term, consistent, and calibrated data and products that are valid across multiple missions and satellite sensors. Thus, the goal of the algorithm refinement activity in this NRA is to provide the scientific community with an archived long-term data set of each relevant measurement parameter with the measurement uncertainties indicated as a function of time and location for all of the data.

The EOS Algorithm Refinement proposals should provide strong scientific support to maintain the quality and accuracy of the EOS products defined by Algorithm Theoretical Basis Documents (ATBD) and should enable appropriate product refinement in the context of evolving knowledge of the performance of the instrument and algorithms and the underlying Earth System processes. This scientific support consists of evaluating the performance of the algorithms and comparing the derived measurements with other forms of regularly available and accepted methodologies to validate the efficacy and accuracy of the algorithms under a variety of regional and climatic conditions. Sometimes there is a need for analyzing the received data in such a manner as to provide information that monitors the changing instrument characterization due to technical or orbital changes.

Science Data Analysis and Modeling Research Proposals

The Data Analysis and Modeling Research proposals should focus on research that will answer the ESE key science questions defined in the ESE Research Strategy. This area, in particular, should provide new opportunities for scientists not previously associated with the details of EOS sensor instrumentation and development of the ATBD algorithms to contribute to the analysis and interpretation EOS data. The modeling referred to here is primarily the physical, chemical, and biological modeling done to assist in the interpretation of the EOS data (including its spatial and temporal variability) as well as to extend the application of EOS data to all applicable environmental parameters and processes. Modeling can also be used to extend satellite data inputs in regional, continental, and global Earth System models of atmospheric, oceanic, or terrestrial phenomena. Finally, modeling can be used in the global context to predict global changes based upon satellite observations as inputs or, perhaps, statistical constraints on the climatology. NASA is looking for broad and innovative uses of its relevant satellite data. If the ability to apply EOS data to help answer the ESE scientific questions is limited by detailed knowledge of algorithm performance in specific geophysical or biogeochemical regimes and focused field observations (with ground- and/or aircraft-based sensor systems) are required to provide the necessary information for application of EOS data under these conditions, then those complementary measurements that are absolutely essential may be proposed under this section.

The key questions fall into five categories, namely variability, forcing, consequences, response and prediction. They are listed in Table 1. Data analysis and modeling studies anticipated from this NRA may include scientific investigations of information content, comparison with other similar data, variability studies over time and space, forcing and response implications, and forecasting pilot projects to test the physical understanding

and modeling by comparisons of forecasts with documented Earth System processes and events. The proposed efforts should be designed to guarantee measurable progress towards achieving the stated goals. This progress must be in terms of realistic objectives that, to the extent possible, should include quantitative statements about the improvement in knowledge, reduction in uncertainties, etc., that would be obtained from the proposed research. The studies that may be initiated in response to this NRA, and which encompass Earth System processes described by the ESE science questions, may range from individual investigator tasks focusing on a single question to comprehensive multidisciplinary or interdisciplinary investigations oriented towards multiple related questions. Since NASA is required to demonstrate scientific progress in all of its sponsored research activities as part of the Government Performance Requirements Act (GPRA), the proposed scientific efforts will be managed to achieve results and a portion of the proposal should be devoted towards an itemization of anticipated results which can be used as performance metrics.

Table 1

ESE Key Research Questions

Overall: *How is the Earth changing and what are the consequences for life on Earth?*

- ***How is the global Earth system changing?(Variability)***
 - How are global precipitation, evaporation, and the cycling of water changing?
 - How is the global ocean circulation varying on interannual, decadal, and longer time scales?
 - How are global ecosystems changing?
 - How is stratospheric ozone changing, as the abundance of ozone-destroying chemicals decreases and new substitutes increases?
 - What changes are occurring in the mass of the Earth's ice cover?
 - What are the motions of the Earth and the Earth's interior, and what information can be inferred about Earth's internal processes?
- ***What are the primary forcings of the Earth system? (Forcing)***
 - What trends in atmospheric constituents and solar radiation are driving global climate?
 - What changes are occurring in global land cover and land use, and what are their causes?
 - How is the Earth's surface being transformed and how can such information be used to predict future changes?
- ***How does the Earth system respond to natural and human-induced changes?(Response)***
 - What are the effects of clouds and surface hydrologic processes on Earth's climate?
 - How do ecosystems respond to and affect global environmental change and the carbon cycle?
 - How can climate variations induce changes in the global ocean circulation?
 - How do stratospheric trace constituents respond to change in climate and atmospheric composition?
 - How is global sea level affected by climate change?
 - What are the effects of regional pollution on the global atmosphere, and the effects of global chemical and climate changes on regional air quality?
- ***What are the consequences of change in the Earth system for human civilization? (Consequences)***
 - How are variations in local weather, precipitation and water resources related to global climate variation?
 - What are the consequences of land cover and land use change for the sustainability of ecosystems and economic productivity?
 - What are the consequences of climate and sea level changes and increased human activities on coastal regions?
- ***How well can we predict future changes in the Earth system? (Prediction)***
 - How can weather forecast duration and reliability be improved by new space-based observations, data assimilation, and modeling?
 - How well can transient climate variations be understood and predicted?
 - How well can long-term climatic trends be assessed or predicted?
 - How well can future atmospheric chemical impacts on ozone and climate be predicted?
 - How well can cycling of carbon through the Earth system be modeled, and how reliable are predictions of future atmospheric concentrations of carbon dioxide and methane by these models?

IV. Types of Studies Desired Under this NRA :

A wide variety of scientific analysis is encouraged in response to this NRA. Since this EOS recompetition is occurring at a time when the data products from some of the EOS satellite sensors have not yet been completely validated, a limited amount of continuing or new validation intercomparisons will be allowed. Substantial validation work has been done for the Terra sensors and more will continue under the algorithm refinement contracts; however, this NRA can permit new studies that cover new areas of validation needed to verify sensor performance over longer times or different observing conditions. As noted above, comparison with existing satellite and/or ground networks and existing calibration sites may be proposed under the algorithm refinement component of this NRA, while comparisons with focused field measurements not otherwise available should be proposed under the data analysis and modeling research section. It is recognized that in many cases, the best validation of a data set is its use in quantitative scientific studies along with other well-understood data and models. Thus, research studies directed towards answering the science questions identified in the ESE research strategy that may also shed light on the nature of the EOS data are of greater interest.

Much of the knowledge of global environmental variability and its associated climatology has been derived from long-term data series of satellite data and products that have been thoroughly validated and differences between the data from subsequent satellites evaluated and removed. If the incorporation of EOS data into systematic satellite data records is necessary to produce the multi-instrument/multi-platform data sets required to answer the scientific questions being addressed, those costs may be included in the proposal being submitted in response to this NRA. A NASA Cooperative Agreement Notice (CAN) has been released to provide opportunities for investigators to continue efforts that will provide integrated long-term data sets to the research community for use in a broad range of scientific studies.

This NRA is also the appropriate vehicle to provide funding support for the development of new algorithms for EOS data from the sensors on Terra, Aqua, and/or ACRIM. While, for the present, the original EOS data products derived from peer-reviewed Algorithm Theoretical Basis Documents (ATBD) will continue to be produced, it is also possible that additional or alternative algorithms might be developed and incorporated into the EOS production effort at a later time. This NRA allows for the development, testing, comparison, and validation of alternative algorithms. These algorithms must include at least some data from the EOS sensors covered under this NRA, but other data from U.S. or foreign satellites may be combined into composite algorithms, if appropriate. The use of data from more than one sensor on a given satellite platform and/or to combine data from one or more EOS and other satellites is encouraged. If new algorithm development is proposed, it should be related to answering the key ESE scientific questions, and if an alternative algorithm is proposed, it should be demonstrated that the proposed new algorithms represent an improvement in measurement accuracy. In such cases, it is important that an estimate of the expected quantitative benefit be included in the proposal. If a new or replacement algorithm is proposed, then it should be done as a part of a "Data Analysis and Modeling Research" proposal, because of the research nature of

the proposed change and the need to prove the superiority of the new algorithm through new validation efforts.

It is likely that some of the EOS data will have immediate applications relevant to U.S. decision makers, forecast/warning services, and/or the general public. This is especially true for near-real-time data that is available over the U.S. mainland through special rapid processing and is available around the world through the EOS Direct Broadcast System network. A limited number of Science Applications Projects will be considered for funding to enable real-time deliverables for decision-support systems and for short-term evaluation of satellite-observable, environmental conditions like fire locations, air pollution and aerosol coverage and evolution, algal growth in coastal waters, storm warnings, flooding extent, heat island effects, and other local or regional phenomena.

V. NRA Applicability:

This NRA is open to all scientific investigators who submit proposals that respond to the science questions of the program, and meet the other requirements stated in this announcement. Awards will be made for a period of up to three years for approved projects. Participation in the program is open to all categories of domestic and foreign organizations, including educational institutions, industry, non-profit institutions, NASA centers and other U.S. Government agencies. In accordance with NASA policy as described in Appendix B, all investigations by foreign proposers will be conducted on a no-exchange-of-funds basis. Thus, investigators whose home institution is outside the United States cannot be funded by NASA. Current foreign EOS Science Team Members may continue their participation and need not propose again.

VI. NRA Scope and Conditions:

The total budget available for EOS science team leaders and members to conduct Algorithm Maintenance and Data Analysis and Modeling will be approximately \$63M/yr for the next three years. NASA is trying to achieve a balanced program of activity that is keyed to the post-launch status of the flight program missions. As time goes on, less emphasis will be placed upon algorithm refinement and more will be placed on the analysis of EOS data and the modeling of results. The support for algorithm development is currently planned to decrease from about \$30M to \$20M over the next three years, with a corresponding increase in the amount devoted towards scientific data analysis and modeling efforts. Team member proposals should be in the general range of \$150K-300K/yr. The overall program balance will be determined by the selecting official. Both the number of team members and the sizes of the resulting grants and contracts from this solicitation will be determined by the selecting official to achieve an optimal blend of continuing algorithm refinement and necessary continuing calibration and validation

activities while moving aggressively to achieve the maximum exploitation of the new EOS data for answering the key questions of the ESE Research Plan.

Scientists whose team member proposals are selected and approved may become full-fledged EOS Science Team Members. Current EOS Team members whose continuing proposals are not selected will no longer be EOS Science Team Members. Selected investigators using data from more than one instrument science team may participate as members in more than one science team. Proposers should identify which EOS instrument team(s) they desire to join, and should include in their proposed budget travel to at least one team meeting per year per instrument. All proposers also should include in their budgets the cost of attendance at scheduled annual EOS Investigator Working Group meetings.

VII. Proposal Instructions:

Proposals may be submitted at any time through April 15, 2003. Proposals submitted to NASA will be evaluated using scientific peer review. Proposers will be notified of their selection status in mid-2003.

Appendices B through E contain NASA general guidelines for the preparation of proposals solicited by this Research Announcement. All prospective proposers are strongly encouraged to submit a notice of intent in response to this announcement by February 28, 2003 as described in Appendix D. This will allow NASA to assess the range of expertise required to adequately support the proposal review process.

Identifier: NRA 03-OES-02

Submit proposals to: EOS NRA
NASA Peer Review Services, Code Y
500 E Street SW, Suite 200
Washington, DC 20024-2760

Tel: 202-479-9030

Number of Copies Required: 20

Selecting Official:

Dr. Jack Kaye
Director, Research Division
Office of Earth Science

Additional NRA

Information:

Dr. James C. Dodge
EOS Recompensation Coordinator
Research Division
Office of Earth Science
NASA Headquarters, Code YS
Washington, DC 20546
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Fax: (202)-358-2771
Email: jdodge@hq.nasa.gov

Please use identifier number NRA-03-OES-02 when making an inquiry regarding this announcement. Your interest and cooperation in participating in this effort are appreciated.

Original signed by

Dr. Ghassem R. Asrar
Associate Administrator
Office of Earth Science

NASA RESEARCH ANNOUNCEMENT

EARTH SYSTEM SCIENCE RESEARCH USING DATA AND PRODUCTS FROM TERRA, AQUA, AND ACRIM SATELLITES

APPENDIX A: Specific Guidelines for this NRA

APPENDIX B: Instructions for responding to NASA Research announcements (NRA)

APPENDIX C:

1. Proposal Cover sheet
2. Certifications, Disclosures, and Assurances regarding lobbying, debarment and suspension, and drug-free workplace requirements

APPENDIX D: Notice of Intent

APPENDIX E: Budget Summary

NASA RESEARCH ANNOUNCEMENT

APPENDIX A: SCIENTIFIC GUIDELINES FOR THIS NRA

Available Data and Products

It is the intention of this NRA to encourage research that makes use of some of the Terra and ACRIM satellite data that is currently available and the Aqua satellite data which should become available relatively early in the 3-year period for research under this NRA. Not all of the key science questions can be answered with data from Terra and Aqua. Other in-situ and/or satellite data may be used in conjunction with the Terra and Aqua data; however, EOS data for these platforms should have a very significant role in answering the questions. In particular, for the variability and forcing questions defined in the Science Research Strategy, there is a clear focus on long-term observations, which are best addressed with a series of interrelated measurements, of which the EOS observations provide a crucial link. For such long-term studies, it is anticipated that the proposals will utilize EOS data together with data from precursor instruments. Other NRAs have been and will be focused on the use of data from other satellites in the EOS series. Proposals that utilize EOS data together with those from other platforms to answer specific questions (especially those associated with the response, consequences, and/or prediction areas defined earlier) are also appropriate under this NRA. The cost of obtaining any needed data should be included in the proposal.

In general, a good reference for learning about the types of available data products for particular sensors is the Web page for the Science Processing Support Office (SPSO) at:

http://spsosun.gsfc.nasa.gov/spsso/spdb/product_frame1.html

A. Moderate-Resolution Spectroradiometer (MODIS)

MODIS is a facility-class instrument that has generated many global data products, including surface temperature over land and oceans, vegetation indices and land-surface cover, chlorophyll characteristics, snow cover, cloud cover/properties, aerosol properties, fire occurrence, and global total precipitable water. The complete list of available products is listed at the following Internet location:

http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/MODIS/product_descriptions_modis.shtml#mod04_l2

MODIS has many products which can be used to help answer key science questions; however, its strength lies in the questions related to Earth system variability, forcing and

response. MODIS data may be obtained through the GSFC Distributed Active Archive Center (DAAC) at:

<http://daac.gsfc.nasa.gov/>

Snow and ice products from MODIS can be obtained through the National Snow and Ice Data Center at:

<http://www-nsidc.colorado.edu>

MODIS produces 42 standard, interim, special and validation products, some with multiple variants. These are detailed at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=MODIS

The MODIS sensor is on both the Terra and Aqua satellites.

B. Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER)

ASTER is a facility-class instrument provided by Japan. It provides high-spatial resolution images of the Earth's surface and clouds. As such, it is most appropriate for studying physical processes and monitoring surface variability over regions. The data have been designed to study processes like land use, deforestation, desertification, land and playa water-level changes, and other changes in regional vegetation, glaciers, and volcanic processes. ASTER is an on-demand instrument. This means that data will only be acquired over a location if a request has been submitted to observe that area. Any data that ASTER has already acquired are available to all by ordering those data from the Earth Observing System Data Gateway (EDG) at:

<http://edcimswww.cr.usgs.gov/pub/imswelcome/>

Additional information concerning acquiring ASTER data can be found at:

<http://asterweb.jpl.nasa.gov/gettingdata/default.htm>

This NRA can be used to initiate or renew membership on the U.S. ASTER Science Team and to acquire funding to conduct science studies based upon ASTER data.

The ASTER sensor is only on the Terra satellite.

C. Measurements of Pollution in the Troposphere (MOPITT)

MOPITT is a facility-class instrument measuring emitted and reflected infrared radiation that can then be interpreted in terms of CO profiles and total column CO and CH₄. The instrument was supplied by the Canadian Space Agency and the data is available through the NASA Langley Atmospheric Science Data Center, see:

http://eosweb.larc.nasa.gov/PRODOCS/mopitt/table_mopitt.html

The MOPITT data can be used in answering questions about Earth system forcings produced by variability in atmospheric constituents and the related climatic and air quality responses, and will also contribute to studies of the Earth's carbon cycle.

MOPITT generated ten products and variants. These are described at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=MOPITT

The MOPITT sensor is only on the Terra satellite.

D. Multi-angle Imaging SpectroRadiometer (MISR)

The MISR instrument is a P.I.-class instrument that looks at the Earth in four spectral bands for each of nine angular views. Its many views and spectral channels make it appropriate for the study of multi-layered clouds, aerosols and their interaction with incoming and outgoing atmospheric radiation. The instrument can be used both as a global survey instrument to study cloud and aerosol variability and also to better understand radiation forcing and its relationship to climate variability. When the instrument views the earth, it can measure land-surface characteristics like bi-directional reflectance properties, leaf area index, surface cover type, and atmospheric effects in the interpretation of ocean color.

Data from the MISR sensor are available at the NASA Langley Atmospheric Science Data Center:

<http://eosweb.larc.nasa.gov/>

MISR generates 25 products and variants. These are described at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=MISR

The MISR sensor is only on the Terra satellite.

E. Clouds and the Earth's Radiant Energy System (CERES)

CERES is a P.I.-class instrument to measure the Earth's radiant energy fluxes and to relate them to cloud distributions and climate variability. The overall goal is to determine the atmospheric energy budget and its variations over the globe and time. It is long-term and globally oriented; however, it is also the intent to relate its measurements to the cloud properties determined by higher-resolution imagers on other spacecraft.

Data from the CERES sensor are available at the NASA Langley Atmospheric Science Data Center:

<http://eosweb.larc.nasa.gov/>

There are 15 CERES products, see:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=CERES

The CERES sensor is on both the Terra and Aqua satellites. A CERES instrument also functioned aboard the Tropical Rainfall Measuring Mission (TRMM) and studies that utilize data from multiple platforms, including TRMM, may be proposed in response to this NRA.

F. Atmospheric temperature and Moisture Sounding (AIRS/AMSU-A/HSB)

AIRS/AMSU-A/HSB is a set of three instruments operating in the infrared and microwave regions to determine the vertical profiles of temperature and water vapor in the Earth's atmosphere. Taken together, they provide unprecedented spectral resolution and hence finer vertical resolution than ever before. Their data will be used in forecast assessments in order to determine the impact of the improved sounding resolution and accuracy.

There are 10 AIRS products. These are described at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=AIRS

The AMSU sensor has two data products. These also are included in AIRS data are described at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=AMSU

The HSB is a humidity sensor provided by Brazil. The HSB radiances are included in the AIRS products.

The AIRS/AMSU/HSB suite of sensors is only on the Aqua satellite

G. Advanced Microwave Scanning Radiometer (AMSR-E)

The AMSR-E instrument was provided by Japan, but there are both Japanese and U.S. Science Teams. The instrument has six microwave bands from 7 to 89 GHz and can map atmospheric total precipitable water, cloud liquid water, sea-surface wind speed, precipitation estimates, soil moisture categories (wet-dry), sea-ice parameters, and snow cover areas. Its data are useful for inputs to global weather forecasting models as well as variability studies of key water cycle moisture variability studies.

There are 27 categories of AMSR-E products and they may be found at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=AMSR

The AMSR-E sensor is only on the Aqua satellite.

H. Active Cavity Monitor Irradiance Monitor (ACRIM III)

ACRIM III is a P.I. instrument and was launched on its own satellite, ACRIMSAT. Its purpose is to measure the total solar irradiance to a very high precision and accuracy for the purpose of determining possible solar forcing of climate variability or change.

The ACRIM III sensor produces one data product, described at:

http://spsosun.gsfc.nasa.gov/cgi-bin/eos-ksh/product.ksh/inst_name=ACRIM

I. EOS Direct Broadcast (DB) as a Data Source

It should be noted that some of the data covered by this NRA also are available in real-time through EOS Direct Broadcast reception sites around the world. Currently, there are over 57 known locations for this data access. Many are independent of NASA. Within the U.S., there is a NASA-sponsored network of sites. These sites receive all of the Level-0 data from Terra-MODIS, and Aqua-MODIS, AIRS/AMSU/HSB, AMSR-E, and CERES. The sites process MODIS, AIRS/AMSU/HSB, and AMSR-E data to Level-1B, i.e. calibrated, navigated radiances of all bands, and they will produce a limited number of products valuable for real-time validation, intercomparisons, and applications. All data and products will be available on the Internet, see:

<http://rsd.gsfc.nasa.gov/eosdb/>

Guidance for Proposers (Supercedes general guidance in Appendix B.):

General instructions for submission of a proposal in response to this announcement are given in Appendix B. In addition, the following specific guidelines should be adhered to:

- Proposals should not exceed 20 pages of single-spaced pica 12-point type, including figures, but excluding the cover page, abstract, a table of contents, bibliographical references, curriculum vitae, budget information and certifications. (Vitae should not exceed 3 pages per investigator including publications.) To facilitate recycling, proposals should be prepared on white paper using no binding material other than clips or staples. No plastic cover sheet should be used. If color figures are used, proposers should ensure that all copies of the proposal contain color copies of these figures.
- Proposals should be self-contained and should not depend upon to other materials, such as web sites on the Internet, which are not available in peer-reviewed publications. **Attached preprints and reprints of publications and reports will be ignored in the review process.**
- A work plan which describes the specific tasks for each year of the proposal should be included as part of the text.
- Cost for acquisition, storage or processing of data should be included as well as cost for any ancillary data acquisition and computer utilization. If use of a NASA supercomputer is anticipated, an estimate of computational requirements on relevant NASA systems should be given as part of the budget submission.
- NASA's Earth Science Enterprise has adopted commercial data purchases as a mainstream way of acquiring research-quality data, as these commercial capabilities become available. NASA encourages the use of commercially available data sets by Principal Investigators as long as it meets the scientific requirements and is cost-effective. When responding to a NASA Research Announcement, the proposer should identify the commercial data sources intended for use and the associated costs.
- All proposals should include a list of other U.S. Government agency support received and/or expected by the principal investigator and any co-investigators. Investigators who receive other support from the NASA Office of Earth Science should provide a clear statement of the relationship between this proposal and the other activities already funded by NASA.

The review of submitted proposals will be competitive. Proposals will be subject to both mail peer reviews and to the deliberations of a peer review panel. As a consequence of this review process, the proposed budgets and/or work plans may be modified by NASA. Approved proposals will normally be funded for a period up to three years, subject to demonstrated satisfactory performance and the continued availability of funds. Funding of successful proposals is expected to start in mid-2003.

APPENDIX B

INSTRUCTIONS FOR RESPONDING TO NASA RESEARCH ANNOUNCEMENTS

NASA Federal Acquisition Regulation (FAR), Supplement (NFS) Part 1852.235-72, Effective JANUARY, 2000 (Modified)

(a) General.

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

(2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material, that NASA and the awardee mutually agree to be of a privileged nature, will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRAs contain programmatic information and certain requirements which apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information which applies to responses to all NRAs.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. NASA will determine the appropriate instrument. Contracts resulting from NRAs are subject to the Federal Acquisition Regulation and the NASA FAR Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.

(6) To be considered for an award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b) NRA-Specific Items. Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) Transmittal Letter or Prefatory Material.

- (i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;
- (ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;
- (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
- (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
- (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
- (vi) Identification of the NRA, by number and title, to which the proposal is responding;
- (vii) Dollar amount requested, desired starting date, and duration of project;
- (viii) Date of submission; and
- (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) Restriction on Use and Disclosure of Proposal Information. Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) Abstract. Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) Project Description.

(i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance; relation to

the present state of knowledge; and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

(5) Management Approach. For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) Personnel. The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) Facilities and Equipment.

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) Proposed Costs (U.S. Proposals Only).

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal

investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.

(iii) Allowable costs are governed by FAR Part 31 and the NASA FAR Supplement Part 1831 (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations).

(iv) Use of NASA funds--NASA funding may not be used for foreign research efforts at any level, whether as a collaborator or a subcontract. The direct purchase of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. Additionally, in accordance with the National Space Transportation Policy, use of a non-U.S. manufactured launch vehicle is permitted only on a no-exchange-of-funds basis.

(9) Security. Proposals should not contain security classified material. If the research requires access to or may generate security classified information, the submitter will be required to comply with Government security regulations.

(10) Current Support. For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) Special Matters.

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines.

(ii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d) Renewal Proposals.

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) Length. Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. Few proposals need exceed 15-20 pages. Necessary detailed information, such as reprints, should be

included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

(f) Joint Proposals.

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals which specify the internal arrangements NASA will actually make are not acceptable as a means of establishing an agency commitment.

(g) Late Proposals. Proposals or proposal modifications received after the latest date specified for receipt may be considered if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received.

(h) Withdrawal. Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances which dictate termination of evaluation.

(i) Evaluation Factors.

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds.

(j) Evaluation Techniques. Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline

specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) Selection for Award.

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l) Additional Guidelines Applicable to Foreign Proposals and Proposals Including Foreign Participation.

(1) NASA welcomes proposals from outside the U.S. However, foreign entities are generally not eligible for funding from NASA. Therefore, unless otherwise noted in the NRA, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the foreign entity is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA and, if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

(2) All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Those received after the closing date will be treated in accordance with paragraph (g) of this provision. Sponsoring foreign government agencies or funding institutions may, in exceptional situations, forward a proposal without endorsement if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected.

(3) Successful and unsuccessful foreign entities will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations will arrange with the foreign sponsor for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the cost of discharging their respective responsibilities.

(4) Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

- (i) An exchange of letters between NASA and the foreign sponsor; or
 - (ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).
- (m) Export Control Guidelines Applicable to Foreign Proposals and Proposals Including Foreign Participation.
 - (1) U.S. proposals including foreign participation must include a section discussing compliance with U.S. export laws and regulations, e.g., 22 CFR Parts 120-130 and 15 CFR Parts 730-774, as applicable to the circumstances surrounding the particular foreign participation. The discussion must describe in detail the proposed foreign participation and is to include, but not limited to, whether or not the foreign participation may require the prospective proposer to obtain the prior approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, discuss whether the license has been applied for or if not, the projected timing of the application and any implications for the schedule. Information regarding U.S. export regulations is available at <http://www.pmdtc.org> and <http://www.bxa.doc.gov>. Proposers are advised that under U.S. law and regulations, spacecraft and their specifically designed, modified, or configured systems, components, and parts are generally considered "Defense Articles" on the United States Munitions List and subject to the provisions of the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120-130.
- (n) Cancellation of NRA.
 - (1) NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

(End of provision)

Appendix C

Required Proposal Cover Pages

Two steps are required to submit a cover page. The first step is to complete the proposal cover page (see SAMPLE) **electronically** to the SYS-EYFUS Website located at <http://proposals.hq.nasa.gov/>. If the proposer has submitted an electronic Notice of Intent (Appendix D) to SYS-EYFUS, the same user UserID and password can be used to complete the electronic proposal cover page. If the proposer obtained a User ID and password in the process of submitting a proposal for a previous research opportunity announcement, the same user UserID and password can be used to complete the electronic proposal cover page in response to this research opportunity announcement. Be sure to click on "Edit Personal Information" if any of your correspondence information in SYS-EYFUS is not current.

The second step is to print a **hard copy** of the electronic cover page that must be signed by the Principal Investigator and an official by title of the investigator's organization who is authorized to commit the organization. This authorizing signature also certifies that the proposing institution has read and is in compliance with the required certifications printed in full, therefore, these certifications do not need to be submitted separately. This page will not be counted against the page limit of the proposal.

If you do not have a SYS-EYFUS UserID or password, you may obtain one electronically by going to <http://proposals.hq.nasa.gov> and performing the following steps:

3. Click the hyperlink for **new user** that will take you to the Personal Information Search Page.
4. Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
5. Confirm your personal information by **choosing** the record displayed.
6. Select **continue**, and a User ID and password will be e-mailed to you.

Once you receive your User ID and Password, **login** to the SYS-EYFUS website and follow the instructions for **New Proposal Cover Page**.

Proposers without access to the web or who experience difficulty in using this site may contact the Help Desk at proposals@hq.nasa.gov (or call 202-479-9376) for assistance. After you have submitted your notice of intent or proposal cover page electronically, if you are unsure if it has been successfully submitted, **do not re-submit**. Please call the Help Desk. They will be able to promptly tell you if your submission has been received. Please note that submission of the electronic cover page does not satisfy the deadline for proposal submission.



Proposal Cover Page

Proposal Number: _____

Date: ____/____/____

Name of Submitting Institution: _____

Congressional District: _____

Proposal Title: _____

Name of Submitting Institution: _____

Congressional District: _____

Certification of Compliance with Applicable Executive Orders and US Code

By submitting the proposal identified in this *Cover Sheet/Proposal Summary* in response to this Research Announcement, the Authorizing Official of the proposing institution (or the individual proposer if there is no proposing institution) as identified below:

- certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;
- agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal; and
- confirms compliance with all provisions, rules, and stipulations set forth in the two Certifications contained in this NRA [namely, (i) *Assurance of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs*, and (ii) *Certifications, Disclosures, And Assurances Regarding Lobbying and Debarment & Suspension*].

Willful provision of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

NASA PROCEDURE FOR HANDLING PROPOSALS

This proposal shall be used and disclosed for evaluation purposes only, and a copy of this Government notice shall be applied to any reproduction or abstract thereof. Any authorized restrictive notices that the submitter places on this proposal shall also be strictly complied with. Disclosure of this proposal for any reason outside the Government evaluation purposes shall be made only to the extent authorized by the Government.

Principal Investigator Name:		Authorized Institutional Official Name:	
Organization:		Organization:	
Department:		Department:	
Mailing Address:		Mailing Address:	
City, State Zip:		City, State Zip:	
Telephone Number:		Telephone Number:	
Fax Number:		Fax Number:	
Email Address:		Email Address:	
Principal Investigator Signature:	_____	Authorized Institutional Official Signature:	_____
Date:	_____	Date:	_____

Co-Investigator:

Name	Telephone	Email	Institution	Address

Budget:

Year	Budget
1	
2	
3	

<i>Total</i>	
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Assurance of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs

The (*Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant "*) hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), Title IX of the Education Amendments of 1972 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear on the Proposal Cover Sheet above are authorized to sign on behalf of the Applicant.

CERTIFICATIONS, DISCLOSURES, AND ASSURANCES REGARDING LOBBYING AND DEBARMENT & SUSPENSION

1. LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 14 CFR Part 1271, as defined at 14 CFR Subparts 1271.110 and 1260.117, with each submission that initiates agency consideration of such applicant for award of a Federal contract, grant, or cooperative agreement exceeding \$ 100,000, the applicant must **certify** that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit a Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

2. GOVERNMENTWIDE DEBARMENT AND SUSPENSION

As required by Executive Order 12549, and implemented at 14 CFR 1260.510, for prospective participants in primary covered transactions, as defined at 14 CFR Subparts 1265.510 and 1260.117—

(1) The prospective primary participant **certifies** to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Appendix D

Notice of Intent to Propose

In order to plan for a timely and efficient peer review process, *Notices of Intent* (NOI's) to propose are strongly encouraged by the date given in this NRA. The submission of a NOI is not a commitment to submit a proposal, nor is information contained therein considered binding on the submitter. NOI's are to be submitted electronically by entering the requested information through SYS-EYFUS Web site located at <http://proposals.hq.nasa.gov/>.

User identifications (IDs) and passwords are required by NASA security policies in order to access the SYS-EYFUS Web site.

If the proposer obtained a User ID and password in the process of submitting a proposal for a previous research opportunity announcement, the same user UserID and password can be used to complete the electronic Notice of Intent to Propose in response to this research opportunity announcement.

If you do not have a SYS-EYFUS UserID or password, you may obtain one electronically by going to <http://proposals.hq.nasa.gov> and performing the following steps:

7. Click the hyperlink for **new user** which will take you to the Personal Information Search Page.
8. Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
9. Confirm your personal information by **choosing** the record displayed.
10. Select **continue**, and a User ID and password will be e-mailed to you.

Once you receive your User ID and Password, **login** to the SYS-EYFUS Web site and follow the instructions for **New Notice of Intent**.

At a minimum, the following information will be requested:

- NRA number, alpha-numeric identifier, (Note: this may be included on the Web site template);
- the Principal Investigator's name, mailing address, phone number, and E-mail address;
- the name(s) of any Co-Investigator(s) and institution(s) known by the NOI due date;
- a descriptive title of the intended investigation; and,
- a brief description of the investigation to be proposed.

A separate NOI must be submitted for each intended proposal.

Appendix E

BUDGET SUMMARY

For period from _____ to _____

- Provide a complete Budget Summary for year one and separate estimated for each subsequent year.
- Enter the proposed estimated costs in Column A (Columns B & C for NASA use only).
- Provide as attachments detailed computations of all estimates in each cost category with narratives as required to fully explain each proposed cost. See *Instructions For Budget Summary* on following page for details.

	A	<u>NASA USE ONLY</u>	
		B	C
1. <u>Direct Labor</u> (salaries, wages, and fringe benefits)	_____	_____	_____
2. <u>Other Direct Costs:</u>			
a. Subcontracts	_____	_____	_____
b. Consultants	_____	_____	_____
c. Equipment	_____	_____	_____
d. Supplies	_____	_____	_____
e. Travel	_____	_____	_____
f. Other	_____	_____	_____
3. <u>Indirect Costs*</u>	_____	_____	_____
4. <u>Other Applicable Costs</u>	_____	_____	_____
5. <u>SUBTOTAL--Estimated Costs</u>	_____	_____	_____
6. <u>Less Proposed Cost Sharing</u> (if any)	_____	_____	_____
7. <u>Carryover Funds</u> (if any)			
a. Anticipated amount : _____			
b. Amount used to reduce budget	_____	_____	_____
8. <u>Total Estimated Costs</u>	_____	_____	XXXXXXXX
9. APPROVED BUDGET	XXXXXXX	XXXXXXXX	_____

*Facilities and Administrative Costs.

INSTRUCTIONS FOR BUDGET SUMMARY

1. Direct Labor (salaries, wages, and fringe benefits): Attachments should list the number and titles of personnel, amounts of time to be devoted to the grant, and rates of pay.
2. Other Direct Costs:
 - a. Subcontracts: Attachments should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting.
 - b. Consultants: Identify consultants to be used, why they are necessary, the time they will spend on the project, and rates of pay (not to exceed the equivalent of the daily rate for Level IV of the Executive Schedule, exclusive of expenses and indirect costs).
 - c. Equipment: List separately. Explain the need for items costing more than \$5,000. Describe basis for estimated cost. General purpose equipment is not allowable as a direct cost unless specifically approved by the NASA Grant Officer. Any equipment purchase requested to be made as a direct charge under this award must include the equipment description, how it will be used in the conduct of the basic research proposed and why it cannot be purchased with indirect funds.
 - d. Supplies: Provide general categories of needed supplies, the method of acquisition, and the estimated cost.
 - e. Travel: Describe the purpose of the proposed travel in relation to the grant and provide the basis of estimate, including information on destination and number of travelers where known.
 - f. Other: Enter the total of direct costs not covered by 2a through 2e. Attach an itemized list explaining the need for each item and the basis for the estimate.
3. Indirect Costs*: Identify F&A cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. Provide the name, address, and telephone number of the Federal agency official having cognizance. If unapproved rates are used, explain why, and include the computational basis for the indirect expense pool and corresponding allocation base for each rate. (*Facilities and Administrative Costs)
4. Other Applicable Costs: Enter total explaining the need for each item.
5. Subtotal-Estimated Costs: Enter the sum of items 1 through 4.
6. Less Proposed Cost Sharing (if any): Enter any amount proposed. If cost sharing is based on specific cost items, identify each item and amount in an attachment.
7. Carryover Funds (if any): Enter the dollar amount of any funds expected to be available for carryover from the prior budget period. Identify how the funds will be used if they are not used to reduce the budget. NASA officials will decide whether to use all or part of the anticipated carryover to reduce the budget (not applicable to 2nd-year and subsequent-year budgets submitted for award of a multiple year award).

8. Total Estimated Costs: Enter the total after subtracting items 6 and 7b from item 5.